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The comet is moving in a plane inclined  $140^{\circ}$  to the ecliptic. Its nearest approach to the Sun occurs on December 25th, when it will be eighty million miles from it. At present it is visible in an opera-glass. It is increasing in brilliancy, and will reach a maximum about October 25th. During October its positions among the constellations will be as follows: On the 1st it passes near *Beta Cephei*; 7th, near *Theta Cephei*; 13th, near *Theta, Iota, and Kappa Cygni*; from the 15th to the 31st, through the constellation *Lyra*, passing about  $10^{\circ}$  east of *Vega* on the 21st. The nearest approach to the Earth, one hundred and twenty million miles, will occur on the 15th of October.

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BERKELEY ASTRONOMICAL DEPARTMENT,  
September 22, 1908.

NOTE ON THE ORBIT OF  $\beta$  612.

In *Lick Observatory Bulletin*, No. 101, I published an investigation of the orbit of this binary system which led to a periodic time of 34.4 years. The elements given represented the observed motion to 1906, inclusive, reasonably well, though the run of the residuals gave some evidence of systematic errors, and it was clear that improvements could be effected when observations in the first quadrant became available. The ephemeris for the years following 1906 predicted a steady increase of the apparent distance between the two components with decreasing angular motion until the companion had reached the position given by BURNHAM at the time of discovery, in 1878. My measures in 1907 and 1908, however, showed little or no increase of distance and very rapid angular motion, so that the residuals in the two years were, respectively,

$$+ 22^{\circ}.3, - 0''.05, \text{ and } + 50^{\circ}.1 \text{ and } - 0''.08.$$

It was clear that my orbit was unsatisfactory, and this star was therefore used as one of the illustrations in a course on "Double-Star Astronomy," given this year at the summer session of the University of California. Four graduate students, under my direction, attempted to improve my published elements, using the data given in BURNHAM'S "General Catalogue

of Double Stars" and my recent measures. Considerable improvement was effected by reducing the periodic time to thirty years, with corresponding changes in the other elements, but the residuals for the measures of BURNHAM and HALL in 1878 were nearly  $10^\circ$ , and for my measures in 1908 over  $20^\circ$ . It was also necessary to assume that the earlier observers had greatly over-measured the distance, while I had made as great an error in the opposite direction. We therefore concluded that no satisfactory orbit could be derived from the available data, and Professor LOHSE, of the Potsdam Observatory, has recently expressed a similar opinion.<sup>1</sup>

A recent examination of the original measures by BURNHAM in 1878 and by HALL in 1878 and 1879 has led me to a new discussion of the orbit, based on the assumption that the companion star in those years was not in the first quadrant, as BURNHAM gives it, but in the third, and that the motion by the year 1891 had amounted to  $315^\circ$ , instead of only  $135^\circ$ , as was then naturally supposed. That this is a valid assumption appears from the fact that BURNHAM makes no distinction in magnitude between the two components, while HALL actually gives the third quadrant in his measures in 1879. Other observers, too, find little or no difference in the brightness of the two stars. This assumption gives an orbit with a periodic time of only 22.8 years, which represents the observed positions to 1903 and those of the last two years within the probable error of measure of so difficult a pair. My observations in 1904, 1905, and 1906 are not quite so well represented, but the star in those years was approaching periastron and the apparent distances were found to be only  $0''.11$ ,  $0''.10$ , and  $0''.13$ , respectively. The angle measures must therefore be regarded as less exact than those in earlier years. It is also true that very slight changes in the elements produce large changes in the residuals in this part of the curve.

From these investigations I conclude that the shorter period, 22.8 years, is approximately correct. The details of the discussion will be published as a *Lick Observatory Bulletin*.

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R. G. AITKEN.

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<sup>1</sup> *Publikationen des Astrophysikalischen Observatoriums zu Potsdam*, No. 58, p. 103. 1908.